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(54) Title: CONTAINER WITH INTEGRATED VACUUM PANEL, LOGO AND GRIP PORTION

(57) Abstract: A container includes a top portion and a bottom portion. The top portion includes a shoulder that extends away from a neck of the container, and a grip portion. The grip portion defines an integral logo portion and is recessed within the top portion of the container. A waist or groove is provided on adjacent lateral sides of the grip portion and may include a lateral stiffening rib. The bottom portion of the container includes a plurality of vacuum panels that accommodate for internal forces tending to cause collapse of the vacuum panels during a hot-fill process. Any portion of the internal forces not accommodated by the vacuum panels in the bottom portion of the container is accommodated by an auxiliary vacuum panel, which is provided in the grip portion of the container.

CONTAINER WITH INTEGRATED VACUUM PANEL, LOGO AND GRIP PORTION
CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application Serial No. 60/262,641, filed January 22, 2001, the contents of which are incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] This invention relates to plastic containers. In particular, this invention relates to polyethylene terephthalate (PET) containers which may be hot-fillable and which include an improved grip portion, logo portion and/or vacuum panel configuration.

2. Description of Related Art

[0003] U.S. Patent No. 5,762,221 discloses a hot-fillable, blow-molded plastic container having a reinforced dome at the upper portion of the container. The dome has a plurality of lands and grooves. Each land has a panel that further reinforces and strengthens each land. Each panel is located in the upper dome portion completely above the waist. Each panel can have an integral textured design formed thereon. For example, the panel could display a textured design of grapes or oranges, a brand, advertising or source type, or it can simply be for artistic purposes.

[0004] U.S. Patent No. 5,067,622, incorporated herein by reference, discloses a PET container for hot-filled applications. The container includes conventional vacuum deformation panels that are formed in a frusto-conical neck segment. In addition, a vacuum panel may be provided in the base portion of the container.

[0005] U.S. Patent Nos. 6,044,997 and Des. 420,919 disclose containers having a grippable container dome. Grip portions on the container dome may accommodate up to 5%

of the volumetric shrinkage of the container due to hot fill, capping and cooling. The balance is accommodated by the vacuum panels in the lower portion of the container.

[0006] A need has developed in the art to develop a container having an easily grippable portion that is positioned closer to the center of gravity of the container and/or dimensioned with respect to its height, width and depth to improve the hand fit of the user. Another need has developed to more prominently display the source of origin, e.g., logos, etc., and to utilize the grippable portion as a vacuum panel and/or logo portion.

SUMMARY OF THE INVENTION

[0007] One aspect of the present invention is to provide a plastic, e.g., PET, container with an improved grip portion. The grip portion has a height, width and depth that are dimensioned to provide a good hand-fit to a wide variety of hand sizes. Further, the grip portion can be located closer to the center of gravity of the container to improve the ability to hold onto and pour liquid contents from the container.

[0008] Another aspect of the present invention is to provide a grip portion which also serves as a logo portion and/or an auxiliary vacuum panel. The logo portion can be enlarged to enhance product recognition.

[0009] According to one preferred embodiment of the present invention, there is provided a hot-fillable plastic container, comprising a body portion having a top portion and a bottom portion. The top portion includes a shoulder, a grip portion below the shoulder and inwardly recessed into the body portion and a ledge provided along at least one lateral extreme of the grip portion due to inwardly recessing the grip portion. The grip portion defines at least one first vacuum panel. The bottom portion includes a plurality of second vacuum panels and a base portion below the plurality of second vacuum panels. Each of the plurality of vacuum panels has a deformation capability that is different than a deformation capability of the at least one first vacuum panel.

[0010] In embodiments, the hot-fillable container may further comprise a plurality of lateral ribs positioned within each of the second vacuum panels, and/or at least one lateral rib provided on the top portion of the body portion and laterally adjacent the at least one first vacuum panel. The container may be substantially rectangular and define two longer sides and two shorter sides, each of the longer sides having at least one first vacuum panel, and each of the shorter sides including at least one horizontal rib provided on the upper portion of the body portion and laterally adjacent each at least one first vacuum panel. A waist portion may extend into the body portion, with the grip portion and the at least one first vacuum panel being provided laterally adjacent the waist portion. The at least one first vacuum panel provided in the grip portion may define an integral logo portion having a logo.

[0011] According to another preferred embodiment of the present invention, a hot-fillable plastic container comprises a top portion including a shoulder and a grip portion that is recessed about 2-10mm into the top portion, and a bottom portion integrally formed with the top portion. The bottom portion includes a plurality of vacuum panels that accommodate internal forces tending to collapse the vacuum panels inwardly due to filling of the container with a liquid at an elevated temperature and subsequent cooling of the liquid. The grip portion in the top portion defines an auxiliary vacuum panel that accommodates for any portion of the internal forces not accommodated by the vacuum panels in the bottom portion.

[0012] According to yet another embodiment of the present invention, a plastic container comprises a body portion having a top portion and a bottom portion. The body portion defines a center of gravity in a region along a transition between the top and bottom portions. The top portion includes a shoulder and a grip portion that at least partially coincides with the center of gravity of the body portion. The bottom portion provides a surface that is adapted to receive a wrap-around label.

[0013] Some embodiments may include a plurality of vacuum panels in the bottom portion and an auxiliary vacuum panel in the grip portion. A waist portion may extend into the body portion, with the grip portion and the auxiliary vacuum panel being provided laterally adjacent the waist portion. The grip portion may define an auxiliary vacuum panel and logo integrally formed therewith.

[0014] According to still another aspect of the present invention, a container comprises a body portion having a top portion and a bottom portion integral with the top portion, the top portion having a generally rectangular shape defining two shorter sides and two longer sides, a grip portion provided in each of the longer sides of the top portion, a waist portion provided laterally adjacent the grip portion and along the two shorter sides of the top portion, and at least one laterally extending stiffening rib provided within the waist portion and laterally adjacent the grip portion.

[0015] Yet another embodiment of the invention is directed to a hot-fillable plastic container comprising a top portion including a shoulder, an inwardly depressed grip portion and a waist portion that extends into the top portion where the grip portion is positioned. A bottom portion is integrally formed with the top portion, the bottom portion including a plurality of vacuum panels that accommodate internal forces tending to collapse the vacuum panels inwardly due to filling of the container with a liquid at an elevated temperature and subsequent cooling of the liquid. The grip portion in the top portion defines an auxiliary vacuum panel that accommodates for any portion of the internal forces not accommodated by the vacuum panels in the bottom portion, and the container is substantially rectangular and defines at least a first side and a second side, the first side having said auxiliary vacuum panel, and at least the second side including the waist.

[0016] Still another aspect of the present invention is directed to a plastic container comprising a body portion having a top portion and a bottom portion, the top portion

including a grip portion that has a height, width and depth that are dimensioned and structured to provide a good hand-fit for a variety of hand sizes. In embodiments, the height of the grip portion is about 25-50% of a height of the top portion, the width of the grip portion is about 50-90% of a width of the grip portion, and the depth of the grip portion is about 2-10mm.

[0017] These and other aspects of the present invention will be described in or apparent from the following detailed description of preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Preferred embodiments of the invention will be described with reference to the following drawings, in which:

[0019] Fig. 1 is a perspective view from the top, front side of a container according to one preferred embodiment of the present invention;

[0020] Fig. 2 is a front elevation view of a container according to the present invention, the rear view thereof being identical thereto;

[0021] Fig. 3 is a left side view of the container shown in Fig. 2, with the opposite view thereof being identical thereto;

[0022] Fig. 4 is a top view of the container shown in Fig. 2; and

[0023] Fig. 5 is the bottom view of the container shown in Fig. 2.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0024] Figs. 1-5 show one preferred embodiment of the present invention. In the figures, reference number 10 designates a plastic, e.g. polyethylene terephthalate (PET), hot-fillable beverage container. As shown in Fig. 2, the container 10 has an overall height A of about 260 millimeters and a panel section height B of about 100 millimeters. The height A is selected so that the container 10 fits on the shelves of a supermarket. As shown in Figs. 4 and 5, the container 10 is substantially rectangular, for example, and includes longer sides 15

each having a width C of about, e.g., 115 millimeters, and shorter sides 20 having a width D of about, e.g., 90 millimeters. The widths C and/or D are selected so that the container 10 can fit within the door shelf of a refrigerator. A base portion 25 (best shown in Fig. 2) of the container 10 has a width that is slightly greater than the widths C and D of the sides 15, 20 of the container 10. Provisional Application Serial No. 60/262,641 shows additional exemplary dimensions of the container 10. In this particular embodiment, the container 10 has a volume capacity of about 64 oz. Those of ordinary skill in the art would appreciate that the following teachings of the present invention are applicable to other containers, such as round or square containers, which may have different dimensions and volume capacities. It is also contemplated that other modifications can be made depending on the specific application and environmental requirements.

[0025] The container 10 includes a neck 30 and a body portion 40 that extends away from the neck 30. The neck 30 may be crystallized to have a substantially opaque appearance, as is well known in the art. However, it is not necessary to provide a crystallized neck. The body portion 40 includes a top portion 45 and a bottom portion 50, which in the exemplary embodiment has a vacuum panel section that is shorter than the top portion 45. A base portion 25 is provided below the vacuum panel section.

[0026] The container 10 is manufactured, for example, using a blow-molding process which is well known. During blow-molding, a preform (not shown) is expanded and assumes the shape of an interior molding surface, i.e., a mold (not shown), to form a substantially transparent, biaxially-oriented container. The neck 30 of the preform is not expanded and remains as the neck 30 of the container 10. The neck 30 includes threads and an open mouth 35 for receiving a screw-on cap (not shown). The lower portion of the preform is expanded to form the body portion 40 of the container 10, including the top portion 45 and the bottom portion 50.

[0027] The bottom portion 50 of the container 10, as shown in Figs. 2 and 3, includes a panel section having a plurality of conventional vacuum panels 55. The base 25 is provided below the vacuum panels 55. For example, each of the longer and shorter sides 15, 20 of the container 10 includes a vacuum panel 55. The vacuum panels 55 accommodate internal forces tending to collapse the vacuum panel 55 inwardly due to filling of the container 10 with a liquid at an elevated temperature, e.g., a pasteurization temperature. After the container 10 is hot-filled and capped, cooling of the liquid tends to collapse the vacuum panels 55. Each vacuum panel 55 may include at least one, e.g. four, lateral stiffening ribs 56 to add rigidity, e.g., to prevent more than a certain amount of deformation of the vacuum panels 55. The vacuum panels 55 on the shorter sides 15 generally accommodate a lesser amount of the internal forces as compared to the vacuum panels on the larger sides 20. Further, the bottom portion 50 of the container 10 is adapted to receive a label 61 (Fig. 3) which is wrapped, e.g., shrink-wrapped, around the vacuum panels 55. For example, the label 61 wraps about the entire perimeter of the container 10.

[0028] A grip portion 65 is provided below shoulder 60. The grip portion 65 is inwardly recessed into the body portion 40. For example, the grip portions 65 on opposite sides of the container 10 are spaced a distance that is less than the width of the top portion of the container. Preferably, each grip portion 65 is recessed about 2-10 mm, and more preferably, about 5mm into the body portion 40. As a result, the border of each grip portion 65 includes a ledge that improves gripability. Preferably, the ledge substantially surrounds the entire grip portion 65, although it is also possible that less than the entire perimeter of the grip portion 65 includes the ledge. For example, the ledge may be limited to just the lateral (left and right) sides or one side of the grip portion 65, where the user grips the container 10. Further, although the grip portion 65 is shown as generally oval shaped, it can take the form of other shapes such as circles, diamonds, rectangles or other geometric shapes.

[0029] The grip portion 65 has a height H which is about one quarter to about one half, and preferably one third, of a height E of the top portion 45 of the body portion 40. The grip portion 65 is adapted to be grasped by the fingers and thumb of a person of average size, for example, an average woman having a size 7 hand. For example, as shown in Fig. 3, the distance d between the grip portions 65 is about 83 mm, although the distance d can range from about 75 to about 90 mm. However, the grip portion 65 is not limited for use by a person having average size hands. In this context, the width of the grip portion 65 is designed to be about 50-90% of the width of the container side wall on which it is placed. Preferably, the width is 60-80%, and most preferably the width is about 70% of the width of the side wall. By selecting and structuring the height, width and depth of the grip portions 65 using the above dimensions, user comfort is enhanced, a good hand-fit is achieved, and the grip portions 65 can be manipulated by a persons having a wide variety of hand sizes.

[0030] The grip portion 65 is provided near the center of gravity of the container 10. The center of gravity of the container 10, assuming it is filled, is just below the logo portion, and can be calculated by those of ordinary skill in the art. For example, the center of gravity for a filled container 10 can be in the region R, as shown in Fig. 2. As shown, the grip portion 65 has a lowermost point that coincides with the region R defining the center of gravity, and extends to a height of between about 25-50% of the height of the top portion 45 of the container 10. Thus, positioning of the grip portions 65 facilitates holding of and pouring liquid contents from the container 10.

[0031] Further, the grip portion 65 may also serve as a logo portion. As shown, each grip portion 65, may include a logo 70 (Fig. 2), such as "Ocean Spray®" and/or the Ocean Spray® "wave". The logo may include an anti-slip surface in the form of raised or embossed (depressed) lettering, logos, characters or other designs, which helps prevent the container 10 from slipping out of the user's fingers and thumb. Further, in addition to or instead of using

integrally formed lettering, designs or logos, the logo may be in the form of a label 67 that is applied, e.g., using an adhesive, to the grip portion 65. Stated differently, the grip portion 65 may also form an auxiliary label portion, which may be coordinated with the wrap-around label provided on the bottom portion of the container 10. If an integrally formed logo is used with the label 67, then it is recommended that the integral logo be embossed into the grip portion, rather than being raised, so as to present a more flat surface to which the label 67 may be secured. Because of the increased size of the grip portion, the logo 70 can be more prominently displayed on the container 10.

[0032] Because of the relatively large size of the logo 70, the top portion 45 of the container 10 can be longer than the bottom portion 50 of the container 10, where the vacuum panels 55 are positioned. Thus, the vacuum panels 55 may not be sufficient to compensate for the amount of internal vacuum forces that tend to collapse the vacuum panels 55 during the hot-fill process. As such, the grip portion 65 is also designed such that it can act as an auxiliary vacuum panel by flexing inwardly during cooling and volumetric shrinkage to accommodate any additional internal vacuum forces that are not accommodated by the vacuum panels 55 in the bottom portion 50 of the container 10.

[0033] The grip portion 70 is positioned, e.g., along the longer sides 15 of the container 10. The shorter sides 20 of the container 10 include a waist portion 75 that is positioned laterally adjacent the grip portion 65 and logo 70. Each of the shorter sides 20 may include at least one lateral stiffening rib 80 positioned within the waist portion 75. The rib 80 serves to prevent excessive deformation of the auxiliary vacuum panel during the hot-fill process. The rib 80 is configured slightly differently than the ribs 56.

[0034] The base portion 25 of the container 10 has a dome-shaped portion 85 which increases strength of the container 10 and facilitates the manufacturing process. The

configuration and shape of the dome-shaped portion 85 may also help assist in the compensation for internal forces created during the hot-fill process, as is known in the art.

[0035] Preferred embodiments of the present invention have been described with reference to Figs. 1-5. Variations and modifications of the preferred embodiments will be apparent to those of ordinary skill in the art without departing from the spirit and scope of the present invention. For example, while an exemplary hot-fillable container has been described, the disclosure is not limited to such and non-hot-fillable containers are also possible, in which event vacuum panels would not be required. In addition, while PET containers made using a blow-molding process have been described, other materials and manufacturing processes are also possible. For example, the container can be made using extrusion molding or other stretch molding techniques, and the container could be made from materials such as, for example, polypropylene, high density polypropylene, polyolefin, styrene and other similar plastic materials.

WHAT IS CLAIMED IS:

1. A hot-fillable plastic container, comprising:
a body portion having a top portion and a bottom portion,
the top portion including a shoulder, a grip portion below the shoulder and inwardly recessed into the body and a ledge provided along at least one lateral extreme of the grip portion due to inward recessing of the grip portion, the grip portion defining at least one first vacuum panel,
the bottom portion including a plurality of second vacuum panels and a base portion below the plurality of second vacuum panels, each of said plurality of said vacuum panels having a deformation capability that is different than a deformation capability of the at least one first vacuum panel.
2. The hot-fillable container according to claim 1, further comprising a plurality of lateral ribs positioned within each of the second vacuum panels.
3. The hot-fillable container according to claim 1, further comprising at least one lateral rib provided on the top portion of the body portion and laterally adjacent the at least one first vacuum panel.
4. The hot-fillable container according to claim 1, wherein the deformation capability of the at least one first vacuum panel is less than the deformation capability of each of the second vacuum panels.

5. The hot-fillable container according to claim 1, wherein the container is substantially rectangular and defines two longer sides and two shorter sides, each of the longer sides having said at least one first vacuum panel, and each of the shorter sides including at least one horizontal rib provided on the upper portion of the body portion and laterally adjacent each said at least one first vacuum panel.
6. The hot-fillable container according to claim 1, further comprising a waist portion that extends into the body portion, the grip portion and the at least one first vacuum panel being provided laterally adjacent the waist portion.
7. The hot-fillable container according to claim 6, further comprising at least one lateral rib provided in the waist portion.
8. The hot-fillable container according to claim 1, wherein the grip portion is positioned substantially along a center of gravity of the body portion.
9. The hot-fillable container according to claim 1, wherein the at least one first vacuum panel provided in the grip portion defines an integral logo portion having a logo.
10. The hot-fillable container according to claim 9, wherein the logo includes raised lettering that serves as an anti-slip surface.
11. The hot-fillable container according to claim 9, wherein the logo portion has a height that is about one quarter to about one-half of a height of the top portion.

12. A hot-fillable plastic container comprising:
a top portion including a shoulder and grip portion that is depressed about 2-10mm into the top portion; and
a bottom portion integrally formed with the top portion, the bottom portion including a plurality of vacuum panels that accommodate internal forces tending to collapse the vacuum panels inwardly due to filling of the container with a liquid at an elevated temperature and subsequent cooling of the liquid,
wherein the grip portion in the top portion defines an auxiliary vacuum panel that accommodates for any portion of the internal forces not accommodated by the vacuum panels in the bottom portion.
13. The hot-fillable container according to claim 12, further comprising a plurality of lateral ribs positioned within each of the vacuum panels provided in the bottom portion.
14. The hot-fillable container according to claim 12, further comprising at least one lateral rib provided on the top portion and laterally adjacent the auxiliary vacuum panel.
15. The hot-fillable container according to claim 12, wherein a deformation capability of the auxiliary vacuum panel is less than a deformation capability of each of the vacuum panels in the bottom portion of the container.

16. The hot-fillable container according to claim 12, wherein the container is substantially rectangular and defines two longer sides and two shorter sides, each of the longer sides having one said auxiliary vacuum panel, and each of the shorter sides including at least one lateral rib provided on the top portion and laterally adjacent each said auxiliary vacuum panel.
17. The hot-fillable container according to claim 12, further comprising a waist portion that extends into the top portion, the grip portion and the auxiliary vacuum panel being provided laterally adjacent the waist portion.
18. The hot-fillable container according to claim 17, further comprising at least one lateral rib provided in the waist portion.
19. The hot-fillable container according to claim 12, wherein the grip portion is adjacent a center of gravity of the container.
20. The hot-fillable container according to claim 12, wherein the auxiliary vacuum panel defines an integral logo portion having a logo.
21. The hot-fillable container according to claim 20, wherein the logo includes an anti-slip surface.
22. The hot-fillable container according to claim 20, wherein the logo portion has a height that is about one-quarter to about one-half of a height of the top portion and a width that is about 50-90% of a width of the top portion.

23. A plastic container, comprising:
a body portion having a top portion and a bottom portion, the body portion defining a center of gravity in a region along a transition between the top and bottom portions,
the top portion including a shoulder and a grip portion that at least partially coincides with the center of gravity of the body portion,
the bottom portion providing a surface that is adapted to receive a wrap-around label.
24. The container according to claim 23, further comprising a plurality of vacuum panels in the bottom portion and an auxiliary vacuum panel in the grip portion.
25. The container according to claim 24, wherein the auxiliary vacuum panel has a deformation capacity that is less than a deformation capacity of each of the vacuum panels in the bottom portion.
26. The container according to claim 24, further comprising a plurality of lateral ribs within each of the plurality of vacuum panels in the bottom portion.
27. The container according to claim 24, further comprising a waist portion that extends into the body portion, the grip portion and the auxiliary vacuum panel being provided laterally adjacent the waist portion.

28. The container according to claim 27, further comprising at least one lateral rib provided in the waist portion.

29. The container according to claim 23, further comprising at least one lateral rib provided in the top portion and laterally adjacent the grip portion.

30. The container according to claim 23, wherein the grip portion defines an auxiliary vacuum panel and logo integrally formed therewith.

31. A container comprising:
a body portion having a top portion and a bottom portion integral with the top portion, the top portion having a generally rectangular shape defining two shorter sides and two longer sides,
a grip portion provided in each of the longer sides of the top portion,
a waist portion provided laterally adjacent the grip portion and along the two shorter sides of the top portion, and
at least one laterally extending stiffening rib provided within the waist portion and laterally adjacent the grip portion.

32. The container according to claim 31, further comprising a plurality of vacuum panels in the bottom portion of the container and an auxiliary vacuum panel in the grip portion of the container.

33. The container according to claim 31, wherein the grip portion is provided substantially along a center of gravity of the body portion.

34. The container according to claim 31, wherein the grip portion includes a vacuum panel portion having a logo formed integrally therewith.

35. A hot-fillable plastic container comprising:
a top portion including a shoulder, an inwardly depressed grip portion and a waist portion that extends into the top portion where the grip portion is positioned; and
a bottom portion integrally formed with the top portion, the bottom portion including a plurality of vacuum panels that accommodate internal forces tending to collapse the vacuum panels inwardly due to filling of the container with a liquid at an elevated temperature and subsequent cooling of the liquid,
wherein the grip portion in the top portion defines an auxiliary vacuum panel that accommodates for any portion of the internal forces not accommodated by the vacuum panels in the bottom portion, and
wherein the container is substantially rectangular and defines at least a first side and a second side, the first side having said auxiliary vacuum panel, and at least the second side including the waist.

36. A plastic container, comprising a body portion having a top portion and a bottom portion, the top portion including a grip portion that has a height, width and depth that are dimensioned and structured to provide a good hand-fit for a variety of hand sizes.

37. The container according to claim 36, wherein the bottom portion includes a wrap-around label.

38. The container according to claim 37, wherein the grip portion defines a logo portion adapted to receive an auxiliary label.

39. The container according to claim 36, wherein the height of the grip portion is about 25-50% of a height of the top portion, the width of the grip portion is about 50-90% of a width of the grip portion, and the depth of the grip portion is about 2-10mm.

40. The container according to claim 36, wherein the height of the grip portion is about 33% of the height of the top portion, the width of the grip portion is about 60-80% of the width of the top portion, and the depth is about 5mm.

41. The container according to claim 40, wherein the width is about 70% of the width of the top portion.

42. The container according to claim 36, wherein the grip portion has at least one of an oval shape, a circular shape, a rectangular shape and a diamond shape.

43. The container according to claim 36, wherein the grip portion defines an anti-slip surface.

44. The container according to claim 43, wherein the anti-slip surface includes at least one of embossments and raised portions.

45. The container according to claim 44, wherein a center of gravity of the container falls within a region where the top and bottom portions meet, and the grip portion and the region have at least one overlapping area.

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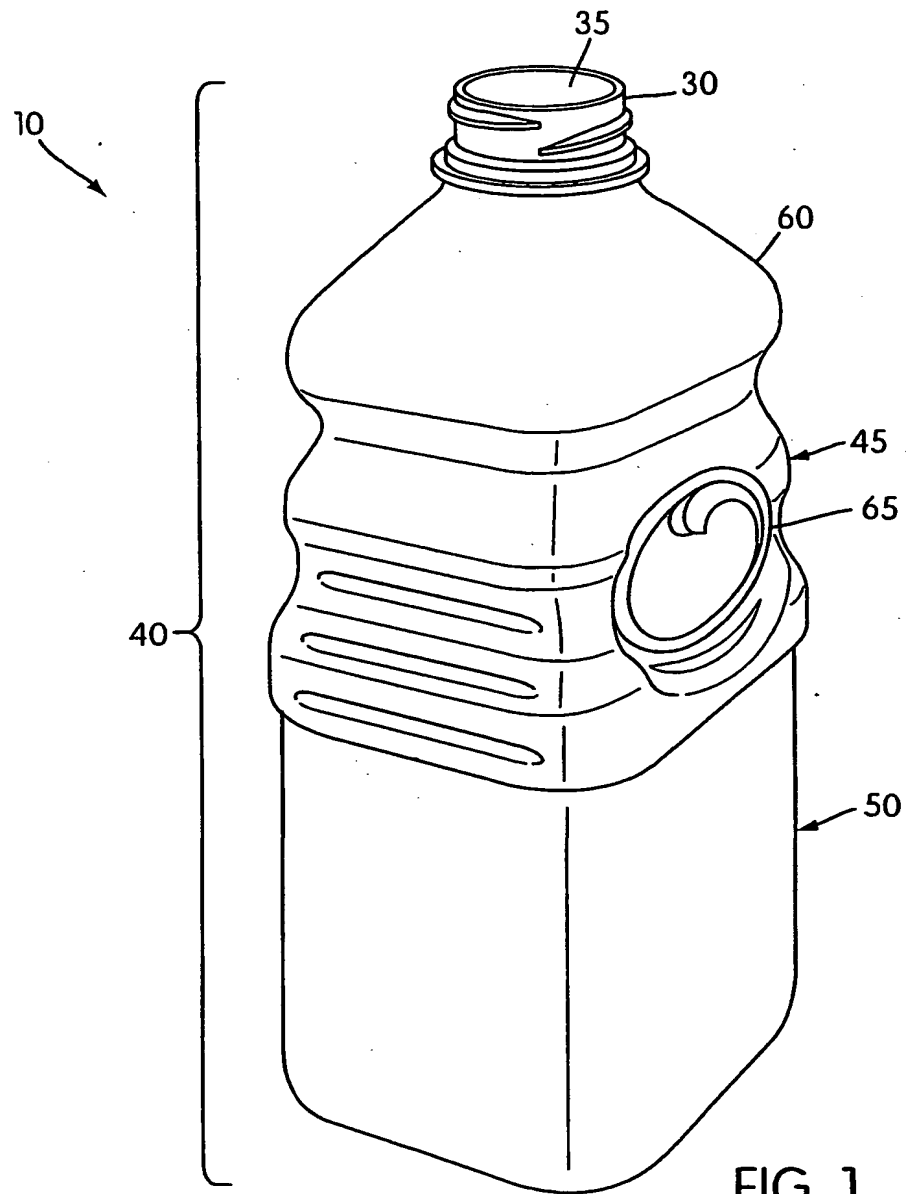


FIG. 1

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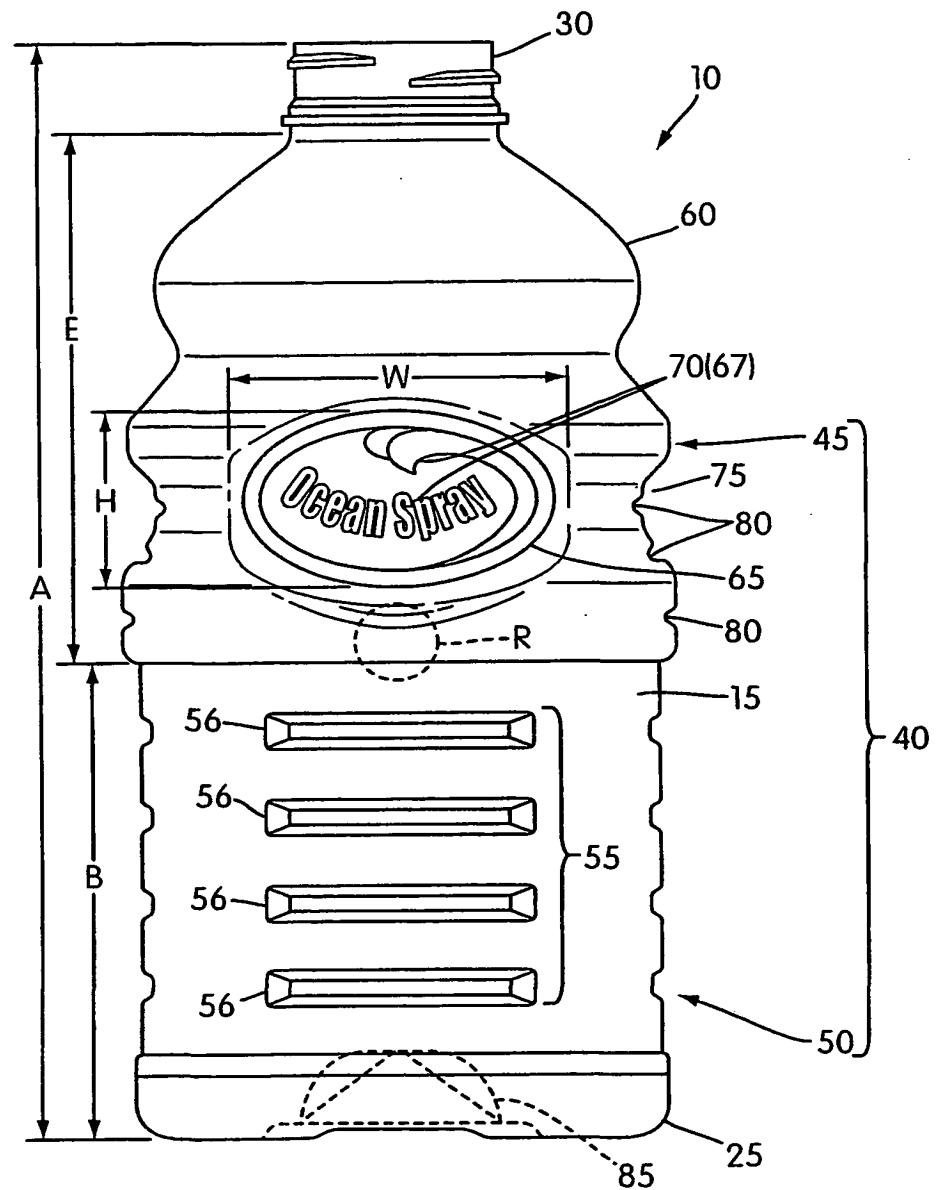


FIG. 2

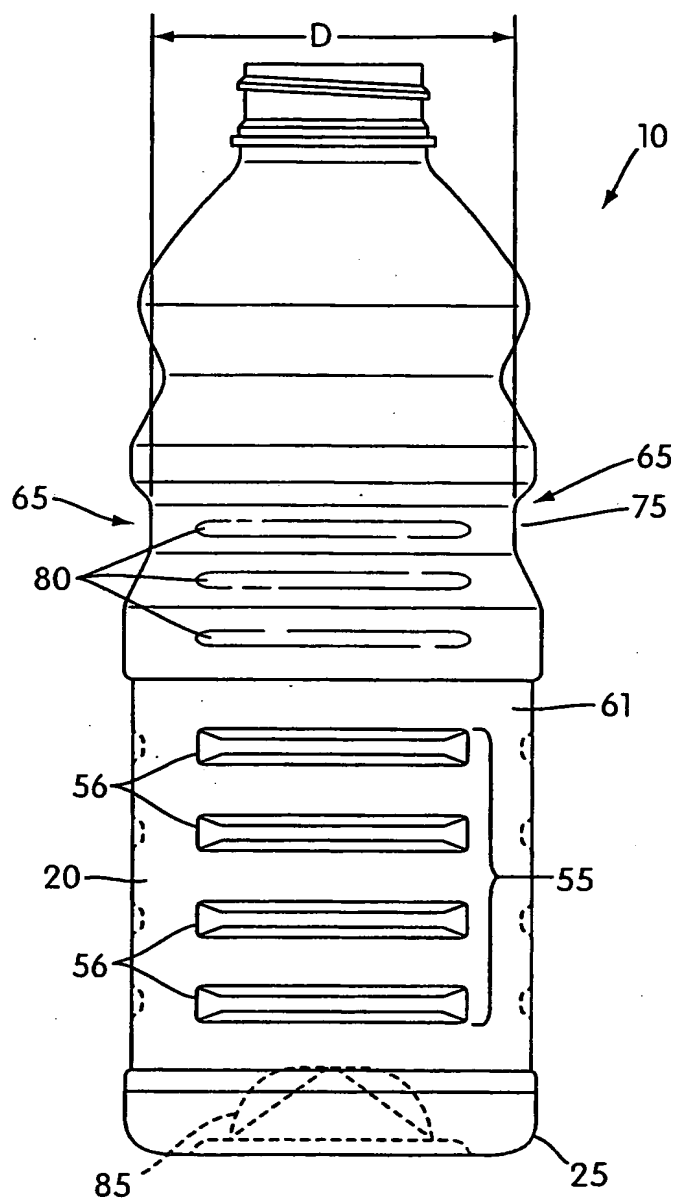


FIG. 3

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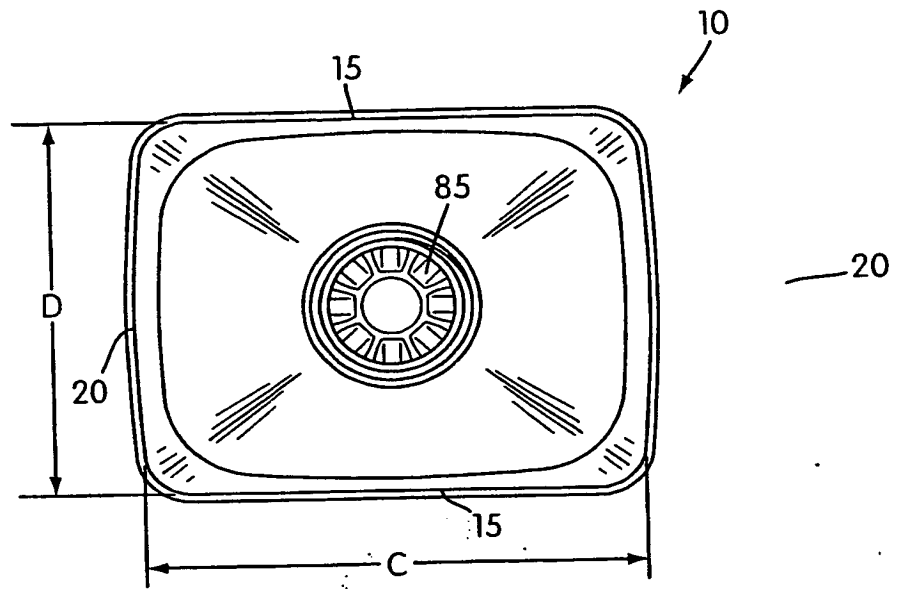


FIG. 4

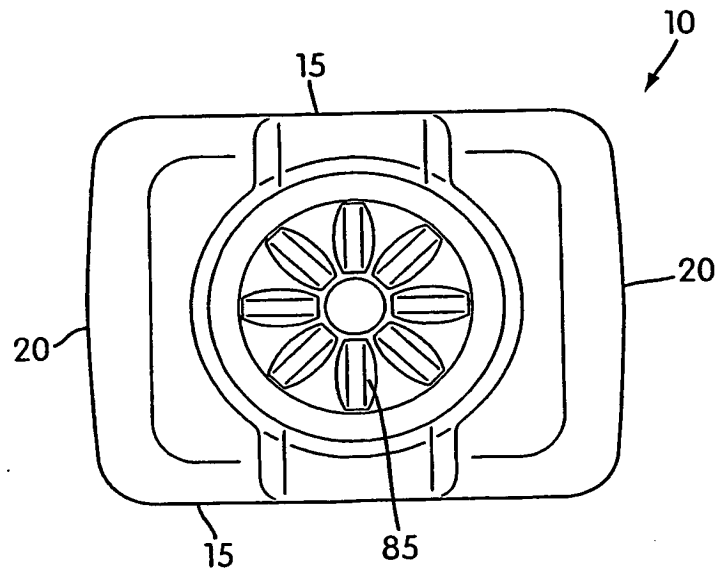


FIG. 5

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Masaaki [JP/JP]; 310 Minoridal, Matsudo-shi, Chiba-ken
270-2297 (JP).

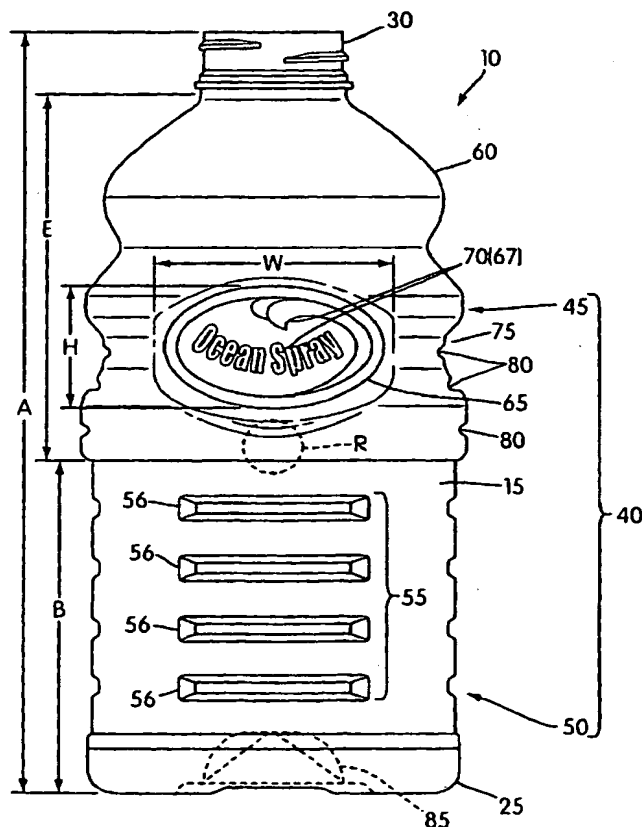
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(81) Designated States (national): AE, AG, AL, AM, AT, AU,
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(54) Title: CONTAINER WITH INTEGRATED VACUUM COMPENSATING PANEL, LOGO AND GRIP PORTION



(57) Abstract: A container includes a top portion (45) and a bottom portion (45). The top portion includes a shoulder (60) that extends away from a neck (30) of the container, and a grip portion (65). The grip portion defines an integral logo portion and is recessed within the top portion of the container. A waist or groove (75) is provided on adjacent lateral sides of the grip portion and may include a lateral stiffening rib (80). The bottom portion of the container includes a plurality of vacuum panels that accommodate for internal forces tending to cause collapse of the vacuum panels (55) during a hot-fill process. Any portion of the internal forces not accommodated by the vacuum panels in the bottom portion of the container is accommodated by an auxiliary vacuum panel, which is provided in the grip portion of the container.

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Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
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INTERNATIONAL SEARCH REPORT

International Application No

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D1/02 B65D23/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 044 997 A (OGG RICHARD K) 4 April 2000 (2000-04-04) cited in the application	1,2,4,6, 8,12,13, 15,17, 19,35
Y	column 2, line 52 - line 64 column 3, line 45 - column 4, line 52; figure 1	3,5,7, 9-11,14, 16,18, 20-22, 24-28, 32,33
X	US 5 148 930 A (OTA AKIHO ET AL) 22 September 1992 (1992-09-22)	23,29
Y	column 2, line 60 - column 3, line 11 column 3, line 62 - line 68; figures	3,14, 24-28,30
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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G document member of the same patent family

Date of the actual completion of the international search

11 December 2002

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INTERNATIONAL SEARCH REPORT

International Application No

101/US 02/01552

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	column 5, line 36 - column 6, line 3; figure 1	7, 18, 28, 31-34, 43-45 40
A	column 8, line 14 - line 18 ----	
X	US 5 971 184 A (KRISHNAKUMAR SUPPAYAN M ET AL) 26 October 1999 (1999-10-26) column 2, line 38 - line 40 column 3, line 12 - line 14 column 4, line 1 - line 3; figures 2, 4 ----	36, 39, 42
X	US 5 732 838 A (YOUNG WILLIAM C) 31 March 1998 (1998-03-31)	36
A	column 4, line 5 - line 6 column 4, line 66 - column 5, line 2 column 5, line 7 - line 12; figure 1 ----	39, 40
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/01552

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1998)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-35

1.1. Claims: 1-22, 35

A hot-fillable plastic container with two different sets of vacuum panels.

1.2. Claims: 23-30

A plastic container with a grip portion specially located relative to the centre of gravity.

1.3. Claims: 31-34

A container with a stiffening rib adjacent the grip portion.

2. Claims: 36-45

A plastic container with a grip portion adapted to various hand sizes.

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/01552

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